No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
Appendix C - Food Web Model						
C-1	DEQ	Appendix C General	Wildlife PRG Methodology	It appears that wildlife sediment PRGs were developed using a BSAF and the human health sediment PRGs for some chemicals were developed using the food web model. Wildlife and human health PRGs based on biota uptake from sediment should be based on the same methodology.		Allen
C-2	DEQ	Appendix C General	Review Time	DEQ understands that EPA has to date not approved the food web model. Since the description of the food web model, Appendix B, was provided for review on August 18th, DEQ has not had a chance to complete our review and confirm that comments provided on the Bioaccumulation Modeling Report, July 21, 2009 have been adequately addressed. Should EPA continue to utilize the food web model for PRG development, we would like to discuss how best to coordinate our review given limited resources.		Allen
C-3	Five Tribes	Appendix C Section 1.1, first paragraph, page 2	Editorial	With respect to the compartments list, can we say something about the order? It appears to be sorted by the trophic level.		Allen
C-4	Five Tribes	Appendix C Section 1.2, second paragraph, page 3	Editorial	Very clear description. It would be nice to have a flowchart showing the transfer of contaminants between trophic levels and the principal physical processes that control those transfers.		Allen
C-5	Five Tribes	Appendix C Section 1.2, fourth paragraph, page 3	Editorial	Comment is made with respect to the following statement: "Typically, the model predicts best when estimating concentrations for chemicals with an octanol-water partition coefficient (K_{ow}) less than $10^{7.5}$ and for small organisms that achieve steady-state rapidly (e.g., phytoplankton, insect larvae, etc.)." The point about small organisms is more or less self-explanatory, but the reference to K_{ow} values greater than $10^{7.5}$ needs some additional explanation. Perhaps there should also be a citation so the reader can get more information if necessary.		Allen
C-6	Five Tribes	Appendix C Section 1.2, fourth paragraph, page 3	Editorial	Comment is made with respect to the following statement: "For larger organisms (e.g., smallmouth bass, carp), growth is assumed to be adequately modeled as a constant fractional increase in body weight over time (k_G)." This sentence seems out of place. I didn't understand how it relates to the preceding sentence regarding the efficacy of the model for large organisms. Please clarify.		Allen

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
C-7	Five Tribes	Appendix C Section 1.2, fifth paragraph, bottom of page 3	Editorial	The sentences below seem too compact and presume a lot on the part of the reader. Please consider the suggested revisions. "~~Chemical partitioning between water and organism (k1/k2), and ingestion (diet) and subsequent uptake in the GI tract (kD/kE), determine steady-state chemical concentrations, though as mentioned above, metabolism may play a critical role for some chemicals/chemical groups.~~ Steady-state concentrations are controlled by the rate of flow in and out of the organism. In general, chemical partitioning between water and organism can be characterized by the ratio of the rate constant describing uptake from water, *k1*, and the rate constant, *k2*, describing the elimination from the organism through the gill or integument. Likewise, the uptake and loss through the digestive tract is controlled by the ratio of the rate constant, *kD*, describing uptake from the GI tract and the rate constant, *kE* , describing elimination in feces. For primary producers, *kD* and *kE* are 0. Although some elimination of chemicals from phytoplankton, algae, and macrophytes may occur, it is assumed to be insignificant." With respect to feces, these ratios are described as being of fundamental importance, but they don't show up independently in equation 1. Not sure I agree that they should be played up as they are.		Allen
C-8	Five Tribes	Appendix C Section 1.2, equation on page 4	Editorial	This is a minor point, but I suggest using either an "x" or a dot in the equations to represent multiplication. Also, added parentheses to show that summation included the product of P_i and $C_{D,i}$.		Allen
C-9	Five Tribes	Appendix C Section 1.2, equation on page 4	Editorial	Something odd about the units. Based on the definitions below m_o * phi *$C_{wt,o}$ has units of concentration, while m_p * $C_{wd,s}$ is unitless. Please check definitions, equations and calculations if necessary.		Allen
C-10	Five Tribes	Appendix C Section 1.2, equation on page 4	Editorial	I suggest specifying units in equation definitions.		Allen
C-11	Five Tribes	Appendix C Section 1.2, equation on page 4	Editorial	With respect to the definition: "C_b – chemical concentration in organism" Meaning of subscript b is not clear. Should the definition be "chemical concentration in organism b" or "concentration of chemical b in organism"?		Allen
C-12	Five Tribes	Appendix C Section 1.2, equation on page 4	Editorial	Is there some reason that k_1, m_o, and m_p are defined with respect to "skin", while k_2 is defined with respect to "integument"?		Allen

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
C-13	Five Tribes	Appendix C Section 1.2, equation on page 4	Editorial	With respect to the definition: "φ – dissolved fraction of chemical in surface water" Seems incomplete. Is this the same phi variable as in equation 3. It's defined there as "fraction of freely dissolved chemical in either surface or transition zone/pore water." Perhaps this would be more clear.		Allen
C-14	Five Tribes	Appendix C Section 1.2, equation on page 4	Editorial	With respect to the definition: "$C_{WD,S}$ – dissolved fraction of chemical in transition zone/pore water" Is this really a fraction or is it a concentration?		Allen
C-15	Five Tribes	Appendix C Section 1.2, last paragraph on page 4	Editorial	This paragraph is well written. However, a flowchart as indicated above would clarify the process.		Allen
C-16	Five Tribes	Appendix C Section 1.3, first paragraph, page 5	Editorial	Table B-3 is referenced prior to Table B-2. Should the table order be reversed to reflect that? That is, should Table B-3 become Table B-2?		Allen
C-17	Five Tribes	Appendix C Section 1.3.1, first paragraph, page 5	Editorial	Thought it would be useful to introduce the definition of K_{BW} as in Equation 3 of Table B-3. Recommend the following revision: "To account for partitioning, ~~a variable~~ the organism-water partition coefficient on a wet weight basis (K_{BW}) is defined for each organism (Equation 2)."		Allen
C-18	Five Tribes	Appendix C Section 1.3.1, paragraph after Equation 2, page 5	Editorial	I thought it was helpful to the reader to explain why this equation was being introduced. Recommend the following revision: "Equation (2) is used to estimate the value of *k2* in equation (1) as a function of the previously determined *k1*. Lipophilic chemicals have a substantial affinity..."		Allen
C-19	Five Tribes	Appendix C Section 1.3.1, paragraph after Equation 2, last sentence, page 5	Editorial	It is nice to give variables a name. I pulled this from Table B-3. "The Bioavailable Solute Fraction ~~A variable~~ (ϕ) ~~is defined to~~ expresses the fraction of freely dissolved chemical in either surface or transition zone/pore water (Equation 3)."		Allen
C-20	Five Tribes	Appendix C Section 1.3.2, *k1* and *k2* subsection, first paragraph, page 6	Editorial	I used definition from Table 3. Seemed confusing to be adding new definition. Also, "diffusion rate" in my mind implies a parameter with units of 1/time, and E_w is apparently unitless. Also, I think the intent of the table reference is to Table B-3, not Table B-1. "For fish, invertebrates and zooplankton, k1 is estimated as a function of ventilation rate (G_v), d~~iffusion rate~~respiratory surface chemical uptake efficiency (E_w) and organism wet weight (W_B) (Table B-~~1~~3 , Equation 4). "		Allen

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
C-21	Five Tribes	Appendix C Section 1.3.2, *k1* and *k2* subsection, first paragraph, page 6	Editorial	There is no equation 6 in Table B-3 as noted in the text below: "Oxygen concentration (Cox) in water is estimated based on thermodynamics as a function of temperature (Cox = (-0.24*T+14.04)*S, where T is temperature in degrees Celsius (°C) and S is percent oxygen saturation (Table B-3, Equation 6)."		Allen
C-22	Five Tribes	Appendix C Section 1.3.2, *k1* and *k2* subsection, first paragraph, last sentence, page 6	Editorial	Suggested text revision to give variable a name as noted earlier: "Respiratory surface chemical uptake efficiency, E_w ~~Diffusion rate (or uptake efficiency)~~ is estimated from the literature as a function of K_{ow} (Table B-3, Equation 7)."		Allen
C-23	Five Tribes	Appendix C Section 1.3.2, *k1* and *k2* subsection, third paragraph in subsection, top of page 7	Editorial	I'm confused about the statement below because I don't see NLOM in Table B3, Equation 10. "For primary producers, calculation of K_{PW} (partition coefficient for primary producers and water) is calculated by substituting NLOM in Equation 2 with non-lipid organic carbon (ww) (Table B-3, Equation 10)."		Allen
C-24	Five Tribes	Appendix C Section 1.3.2, *k1* and *k2* subsection, third paragraph in subsection, top of page 7	Editorial	With respect to the statement, "Note that bioaccumulation factor (BAF) is the ratio of k1 to k2." Isn't this what we were calling K_{BW}, the organism water partition coefficient?		Allen
C-25	Five Tribes	Appendix C Section 1.3.2, m_o and m_p subsection, first paragraph, page 7	Editorial	Can you supply references for the values below? "Values for m_p derived from the literature for organisms with sediment contact are used in the model."		Allen
C-26	Five Tribes	Appendix C Section 1.3.2, m_o and m_p subsection, first paragraph, page 7	Editorial	Indicate which organisms are or are not in close contact with sediment based on the statement below: "For organisms with little or no close contact with sediment, m_p is zero."		Allen

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
C-27	Five Tribes	Appendix C Section 1.3.2, k_D and K_E subsection, first paragraph, page 7	Editorial	All of the terms below appear in Equation 11 except for Temperature. I was initially confused until I found the "indirect" dependence on temperature via Equation 13. Recommend the following revisions: "Rate constant for absorption of chemical from diet (k_D) is expressed as an uptake clearance rate and is a function of transfer efficiency (E_D), feeding rate (G_D), organism weight (W_B) ~~and temperature (T)~~ (Table B-3, Equation 11). This rate constant is also temperature dependent via the evaluation of Gd by Equation 13 in Table B-3."		Allen
C-28	Five Tribes	Appendix C Section 1.3.2, k_D and K_E subsection, second paragraph, page 7	Editorial	What does this mean to say that it "is also a variable"? Recommend the following revision: "Feeding rate (G_D) is also a variable, but can reasonably be approximated based on energy requirements…"		Allen
C-29	Five Tribes	Appendix C Section 1.3.2, k_M subsection, first paragraph, page 8	Editorial	I don't see a discussion of metabolism rate in the calibration section despite the statement in the text that indicates it is provided "below". Should this information be added to Section 1.4? "However, for the Portland Harbor model, estimates of k_M where identified in the calibration process is described below in Section 1.4."		Allen
C-30	Five Tribes	Appendix C Section 1.4, first paragraph, page 9	Model Calibration	I don't agree with the footnote comment that this is a Monte Carlo analysis. What seems to have been done is a very crude form of model optimization by random guesses. Is this really the state-of-the-art for this type of food web model?		Allen
C-31	Five Tribes	Appendix C Section 1.4, first paragraph, page 9	Model Calibration	Comment is made with respect to the following statement: "Results of these runs were used to identify combinations of input parameters that appeared to minimize differences between empirical and predicted PCB concentrations across all trophic levels." Typically in models of this kind there is an objective function defined that describes how well a model matches the measured values. Can you describe how you compared the results of one set of parameters to another with respect to how well they are reproducing the physical processes?		Allen
C-32	Five Tribes	Appendix C Section 1.4, first paragraph, page 9	Model Calibration	Comment is made with respect to the following statement: "This approach did not yield a unique solution – that is, several different combinations of input parameters would yield reasonable fit to empirical data. This issue is further addressed below." Model non-uniqueness is always a problem. I don't see that it's "addressed below".		Allen

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
C-33	Five Tribes	Appendix C Section 1.4, second paragraph on page 10	Model Calibration	Comment is made with respect to the following statement: "An example of output from the calibrated FWM is provided as **Figure B-1**, which shows predicted (modeled) versus empirical data from the RI database." Figure B-1 is really important in providing the reader with confidence that the model captures the important physical processes for each species. The concentrations within a particular species typically varies over two orders of magnitude, whereas the model is able to provide only a single value. Are the model results appropriately conservative in light of the fact that the model-predicted values are frequently an order of magnitude less than the peak measured concentration? Also, for the results shown in Figure B-1, the model seems unable to model the concentrations in clams. Is there the potential for the FS to therefore significantly underestimate the risk posed by consumption of clams and thereby result in a PRG concentration that is not protective of clams? Why have you shown "an example" rather than showing the results for your best-estimate of model parameters?		Allen
Appendix C - Food Web Model Figures						
C-34	Five Tribes	Figure B-1	Editorial	The vertical axis is not accurate in that they haven't plotted the log transform of the concentrations. They have plotted the concentrations on a log-transformed axis. Also, some of the species are not fish. I suggest that the axis title be changed to "Total PCBs tissue concentration (ug/kg ww)".		Allen
Appendix C - Food Web Model Tables						
C-35	Five Tribes	Table B-3	Editorial	There are two Equation 1s listed on table. Equation 3 is not in sequential order. There is not an Equation 6 listed in the table as noted in above. Perhaps it would be better to renumber the equations.		Allen
C-36	Five Tribes	Table B-3	Editorial	With respect to Equation 13: $G_D = 0.022*W_B^{0.85}*e^{(006*T)}$, I believe it should be $G_D = 0.022*W_B^{0.85}*e^{(0.006*T)}$ with a decimal point added. Correct?		Allen
C-37	Five Tribes	Table B-3	Editorial	The sigma term (σ) is not defined in Equation 14. Might there be other terms in this table that are similarly not defined?		Allen
C-38	Five Tribes	Table B-3	Editorial	I don't believe the term highlighted in red below is defined elsewhere. (I found it in text, but perhaps it could be defined here as well to make table useful independent of text.) $C_{WD,P} = C_{S,OC}*\delta_{OCS}/K_{OC}$		Allen

No.	Commentator	Section	Comment Issue	Comment	Response	Lead Responder
C-39	DEQ	Table B-4a Table B-4b	Deterministic vs Probabilistic Values	In FS Appendix B, there appear to be inconsistencies in the deterministic values and the probabilistic range for the following: Table B-4a • Lipid content for phytoplankton, zooplankton, and crayfish. • Fraction of porewater ventilated for amphipod (etc.) Table B-4b • Water content for sculpin • Weight for smallmouth bass		Allen